

Appendix

Derivation of Main Campus Acreage Requirements

Academic Core

The Academic Core consists of the following space types: instructional, research, academic support, and administrative uses.

UC Merced is planned to be a comprehensive research university. The characteristics of such institutions are the primary drivers in determining the space and land requirements of the new campus. While the total planned enrollment for the campus (25,000 students) is important for understanding the nature and size of the campus population, the number of students will not necessarily be a primary determinant for the amount of space required for the core academic campus. Space requirements for instruction and research space on the campus also will be determined by the numbers and types of faculty and staff and the nature of their work.

Distributed learning – the delivery of instruction in a variety of modalities, including satellite locations, distance or on-line learning – will be inherent to the educational process for UC Merced as well as most 21st century colleges and universities. This means that the numbers of students alone will not be determinants of the amount or sizes of instructional space such as classrooms, class laboratories, studios, libraries, etc.

Comparison campuses or “benchmarks” that meet the competitive and programmatic criteria of a preeminent research university were used for the purpose of generating academic square footage and acreage needs. A 1996 national study benchmarked nine universities, including Carnegie Mellon, Georgia Tech, North Carolina State, Purdue, UC Berkeley, University of Illinois, University of Michigan, University of Texas, and Stanford. The study concluded that on average assignable square feet (ASF) per faculty across 23 disciplines ranging from liberal studies to engineering was 1,505 ASF. By applying a similar methodology to UCLA an average ASF per faculty was derived of 1,561 ASF, a difference of only 3.7%.

Applying these factors to the 25,000 full-time equivalent students projected for UC Merced, an ASF of 2,137,100 was derived. An average UC ASF to GSF (gross

square feet) of .60 was applied to derive an overall building requirement of 3,561,833 square feet for academic uses.

The ultimate density or intensity of development on the UC Merced campus must then be considered to determine the acreage required for this land use. Existing UC campuses have a wide existing range of intensity in their core areas, ranging from the high densities of the constrained urban campuses at Berkeley and UCLA, to the much lower densities of those campuses with large sites and that have not yet reached their ultimate enrollment, such as UC Riverside.

GSF was converted to acreage by dividing by a Floor Area Ratio (FAR) of .52. FAR is a measure of the intensity of building development to land area. This intensity will place UC Merced at a somewhat higher density than UC Riverside (.45 existing but with higher densities planned as the campus expands) or UC Davis, which is not entirely built out at this time, but at a significantly lower density than UCLA. This intensity is considered appropriate for the location, mission and desired character of UC Merced.

Based on this overall planned density for the academic core, 157 acres is required to accommodate these uses.

Student Support Services

This program component includes the student union and commons areas, food service, student health, and other services. Guidance was derived from several UC campuses for developing space and acreage requirements for these uses.

The average GSF/student for UC Riverside and UCLA is 16. The average FAR for UC Merced is .52 as explained in the previous section. With the addition of a circulation factor, total acreage required for Student Support Services is 23 acres.

Student Housing

Student housing is basic to the educational mission of the University of California. Currently campuses provide housing for between 20% and 44% percent of all students. Housing directors and senior administrators at all campuses regard these as minimums. The housing goals of the currently approved Long Range Development Plans provide goals of providing housing for 30% to 75% of all students. Many of these LRDP's are currently being updated, and it is expected that goals may rise for many campuses.

Campus	Actual 1999 Enrollment	Actual 1999 Bed Spaces	Percent of Total	Campus Housing Goal
UC Berkeley	29,928	5,870	20%	44%
UC Davis	22,111	4,955	22%	25%
UC Irvine	16,987	5,599	33%	42%
UC Los Angeles	30,901	7,681	25%	50%
UC Merced	-	-	0%	50%
UC Riverside	11,224	2,561	23%	35%
UC San Diego	18,054	6,807	38%	38%
UC Santa Barbara	19,483	4,081	21%	30%
UC Santa Cruz	10,868	4,701	43%	70%

Source: Occupancy Demand Report – UC Office of the President (1/29/01)

The University has determined that provision of housing for freshmen and undergraduate transfer students may be correlated to successful retention rates, and therefore the eight general campuses give priority in housing to these groups. Currently the general campuses provide housing to between 70% and 75% of all freshmen. (Campuses *offer* housing to *all* freshmen; however, only about 90% of freshmen request campus housing on time and only about 75% actually occupy campus housing.)

UC Merced's goal with respect to student housing is based on sound principles of educational outcomes and academic community quality as well as a desire to lessen impacts on the surrounding regional environment including the campus, city, and county. The 250 acre student housing land area is based on an assumption that 50% of the UC Merced student body (25,000 students) will be housed on campus. Of that 50%, the lion's share of housing will be available for freshman and sophomore students. UC Merced's goal, like other campuses, is to provide a guarantee of housing for 100% of freshman, with the expectation that 75% will actually occupy it.

Additionally, freshman students continuing to sophomore status should have available housing as required. A second major target group is transfer students from community colleges. Of this group, 50% would be expected to live on campus.

Finally, targeted residential capacity for graduate students and students with families is important for the recruitment of appropriate graduate students and the opportunities for graduate students on campus. Student family housing (sometimes referred to as student affiliate housing) is important to the University's ability to reach re-entry students, graduate students, and students who have the care of dependents, both children and other family members.

The bulk of housing will accommodate lower division undergraduate students. A primary goal of university housing for undergraduate students is to affiliate students with a "college" for General Education. General Education is that portion of the overall curriculum which is the most fundamental educational experience for lower division students. In the college system, a cohort of freshman students moves through the General Education program as a group. Activities include coursework classes as well as extensive supplemental socializing and acculturating experiences within the academic community. The residential setting and adjacency of the Library and Technology Center allows for informal interactions on a daily basis including work in the library, use of technology, student study groups, and informal interactions with faculty and graduate students. Persistence (retention) rates for young college students are significantly improved with the opportunity for residential living. There is no good substitute for the synergy created for these interactions, which assists students in many ways and encourages greater success in the educational process.

Every effort is needed to provide young San Joaquin Valley students, specifically first generation college-going students and a large population of immigrant

Hispanic and Asian families, this complete college experience. A complete collegiate environment geared towards personal success and raised expectations provides a safe harbor for focusing on educational goals.

UC Merced expects that at least 50% of students initially and perhaps two-thirds in the long run will be from outside the San Joaquin Valley and will therefore not have the option of commuting. The populations of the large urban areas nearest UC Merced are and will remain considerably less than the urban areas near all other UC campuses except UC Davis, which is used as the basis for estimates of student commuter patterns at UC Merced. In addition to these practical issues it should be noted that while the Regents placed the tenth campus in the San Joaquin Valley to improve Valley participation, and to recognize that each UC campus does have in part a regional service role, the campus will not be successful unless it draws students from all over the state. Part of the value of the UC education is that students meet other Californians from very different backgrounds, one of the positive educational benefits of its statewide mission. The tenth campus has to shoulder its fair share in serving the 57,000 additional California students who will be eligible in future years and they will come from all over the state.

In addition to the importance of residential living for undergraduate students, the case for graduate student housing and student housing for student families is compelling. It is clear that given the need to recruit high quality students to a research university, available on-campus living will be important to many. While graduate students can and often do live in the adjacent town or city near a research university, some significant numbers come from international backgrounds and expect residential opportunities on campus. At existing UC campuses UC San Diego has the highest proportion of graduate students housed on campus, at 50%. UCLA currently houses only grad students with families and that has hurt them in recruitment, so they are building single student housing for 2,000 graduates.

Finally, environmental impacts on the region (city, county, and surrounding counties) make a compelling case for maximizing on-campus living opportunities for UC Merced students. With 50% of the student body targeted for on-campus living, substantial impacts on transportation corridors, the natural environment, use of community facilities, use of utilities, and personal services will be avoided. The goal is to provide a complete living and support system on campus or in the nearby “University Community” for this percentage of the students.

The University provides a wide variety of types of housing:

- traditional dormitories (student rooms; common bathrooms, dining commons)
- suites (apartments without kitchens; dining commons)
- apartments (common rooms may or may not be part of program)

The overall goal for UC Merced is 50% times 25,000 students = 12,500 students to be housed. The following distribution of different housing groups is derived from the housing programs of the existing campuses.

Housing Distribution

Undergraduates	= 9,375 students	75 % of total
Graduates	= 1,875 students	15 % of total
Students with families	= 1,250 students	10 % of total

These bed spaces will be needed in various types of units and in various configurations of facilities with appropriate amenities such as dining, recreational space, study rooms, as well as complete access to technology in residential living quarters. For purposes of this LRDP and long term planning for land area needs, it was assumed that all housing would consist of two-bedroom apartments. Apartment size was assumed at 1,000 square feet, however, no common spaces such as dining facilities or lounges were assumed. Student occupancy was analyzed assuming that undergraduates would be housed two per bedroom and graduates at one per bedroom. Student family occupancy was assumed at 1.1 students per apartment based on University experience, reflecting the fact that approximately 10 percent of occupants are students married to each other.

The overall student housing requirement is 4,467 apartments.

No. & Type of Student	No. of students per bedroom	No. of students per apartment	Apartment s required
9,375 undergraduates	@ 2/bedroom	@ 4/apartment	= 2,344 apts
1,875 graduates	@ 1/bedroom	@ 2/apartment	= 987 apts
1,250 student families		@ 1.1/apartment	= 1,136 apts
TOTAL			4,467 apts

Designing student housing with architectural character, human scale and opportunities for social interaction outside the building in the form of plazas, seating and sunny landscaped areas for informal recreation, is essential to providing an integrated living and learning environment. For planning purposes, buildings of 3-4 stories have been assumed, since they are both properly scaled and economical to construct, based on seismic and life safety considerations.

Building density was based on formulas used by the U.S. Department of Housing and Urban Development (HUD) for multi-family housing. Circulation was added based on a separately described study, but because the HUD methodology included a partial allowance for circulation, the allowance was reduced. An overall resulting land requirement of 250 acres was thereby derived for the campus.

Faculty Housing

As the leading national public research university, the University of California is in an intensely competitive recruitment environment for quality faculty. This competition was initially based on salaries but now extends from financial compensation to research resources and to supplemental faculty housing programs, given the extraordinary escalation of California real estate prices over the past quarter century. While mortgage assistance such as the University's Mortgage Origination program have been useful, faculty participation in the open housing market has moved faculty members further and further from the home campuses, leading to a loss of faculty presence in communities surrounding the campus and loss of out-of-class contact with students. Further, this diaspora of faculty to regions more remote from campus has made direct faculty participation in the research mission of the University more sporadic and has increased pollution as more faculty commute increased distances to campus. Construction of faculty housing near campuses has addressed these community, educational, research, and environmental issues.

The provision of adequate acreage for construction of faculty housing on campus reflects one of the most important lessons learned from the experience of planning new UC campuses in the 1950s and 60s. Both UC San Diego and UC Irvine were established in suburban fringe areas that were rapidly being converted to housing

developments, and homes for faculty were readily available. Twenty-five years later at both campuses housing costs escalated beyond a level affordable to entry level faculty.

At UC Santa Barbara and UC Santa Cruz local land use policies and growth moratoria have severely limited new housing supplies, with similar results in price escalation. At UCLA and UC Berkeley, which are located in areas which have been urbanized for about a century but remain highly desirable residential areas, housing costs are so severe that housing bonuses are sometimes required to successfully recruit new faculty. Currently six UC campuses have programs to provide faculty housing.

The acreage requirement is based on the types of housing programs at existing UC campuses and the housing types offered. Products include single family homes, duplexes and townhouses, condominiums and apartments. Both rental and for-sale housing has been developed. Rental housing is owned and operated by the University or a non-profit corporation. In the case of for-sale housing, faculty members purchase the improvement (a house or condominium) and lease the underlying land interest. The terms of the ground lease restrict resale to University-related persons and set a cap on subsequent sales price so that housing remains affordable as it turns over.

While there is no way to predict the real estate market in the Merced region 20 to 25 years hence, provision of a reserve for faculty housing is critical in order to retain the ability to recruit faculty. A total of 90 acres has been set aside to meet this need. This acreage is based on providing 50% of faculty with housing, with a range of types and densities comparable to that found in the surrounding community.

Campus Support

This program component includes the corporate yard, central plant, physical plant buildings, and other services. Since national standards are lacking for these facilities, examples from the University of California system were examined in order to develop an acreage set aside. Given the expanding complexities of handling hazardous materials, the possible need for on-campus police and fire stations, co-generation plants, etc. UC Irvine was selected as most comparable.

With regard to wastewater treatment the University plans to install facilities utilizing natural treatment processes to fulfill its sustainability commitments in the following ways:

- To provide high quality reclaimed water for campus use.
- To serve as an educational facility for students in environmental and engineering disciplines.
- To demonstrate the benefits of sustainable technologies in the area of wastewater treatment.
- To avoid the inefficient utilization of energy in pumping reclaimed water long distances to the campus.

Based on projected wastewater flows a minimum of 10 acres will be needed for an appropriate facility. Additional acreage may also be necessary for storage of reclaimed water.

The total acreage requirement consists of 34 acres for campus support areas plus 10 acres for wastewater treatment for a total of 44 acres. This was adjusted by circulation factor to 56 acres.

Athletics and Recreation

Athletic facilities are essential features of universities and colleges throughout the United States and abroad, and student participation in athletic programs is very high. At major research universities, extensive athletic facilities are provided to support a broad array of intramural, inter-collegiate, extracurricular, administrative and social activities that are part of the educational and social life of students, faculty, and staff, and which provide an essential interface between the campus and the community at large. Athletic programs and facilities have a recognized place in the educational experience of students.

Program Elements of University Athletics and Recreational Facilities

Curricular Offerings

Major universities in the United States offer a variety of courses in the area of athletics, and many often require physical education courses as part of the curriculum for undergraduate students. Beyond courses in physical programs such as swimming, dance, and tennis, many major universities also offer sports

education degrees in physical education, sports management, athletic training, recreation management, etc.

In the UC system, all undergraduate campuses offer an array of recreation coursework, both on a credit and non-credit basis. The Department of Physical Education at UC Riverside, for example offers a wide range of classes intended to give students the skills and knowledge to embrace a lifestyle that includes physical activity. The Department also offers a survey class on the principles of healthful living, and certification classes in first aid, CPR, and lifeguard training, and aquatic instruction. UCLA Recreation offers a wide variety of non-credit courses in fitness, sports, dance, martial arts, tennis and swimming. At UC Berkeley, among others, the recreation program offers physical education instructional classes to students in aquatics, sports, dance, and fitness. At UC Santa Barbara, a variety of credit courses are offered, with four minors available. UC Davis, UCSC, UC Irvine all offer extensive courses in recreation.

Intramural Athletics

In addition to curricular offerings in physical fitness and recreation, intramural athletic activities are an essential part of the undergraduate (and often graduate) programs at major research universities in the United States. Virtually every major college or university employs athletic fields, gymnasiums, tennis and racquetball courts for student use outside the classroom.

At the UC system as well as at other universities, undergraduate participation in intramural athletic programs is very high. Eighty percent of over 15 million students at the collegiate level are participating in various recreational sports programs, according to the National Intramural-Recreation Sports Association.

Intercollegiate Athletics

Major research universities in the United States have well-documented intercollegiate athletics programs, with most campuses fielding dozens of men's and women's teams. Most major universities enroll hundreds of student athlete/scholars each year. In the academic year 1998-99, 353,424 students (male/female, combined) participated in intercollegiate sports in the US according to the NCAA.

Faculty and Staff Participation

At almost all major universities, faculty and staff are encouraged to utilize campus athletic facilities for personal physical activity or participation in classes. This use is quite often very extensive, with hundreds of daily staff/faculty visits to

gymnasium or other facilities. In fact, demand is so high that many campuses have waiting lists for faculty and staff membership in fitness programs.

Alternative Use of Facilities for Administration, Social and Enrichment Events

At major universities, field houses and stadiums are often used for non-athletic purposes but in ways that facilitate or enhance the educational experience of students. At many universities, gymnasiums and field houses are the only structures large enough to provide for registration of students en masse, graduations, academic convocations, etc. In addition, these facilities are often used for events that augment the educational experience such as: speeches by major national/international figures, multicultural festivals, dance troupe performances, live music performances, crafts fairs, marching band and cheerleader competitions, etc.

Locational Factors

Athletic facilities at major universities provide essential locations for interaction with the local community. This interaction occurs through attendance at sporting events, multicultural fairs, dance performances, major speeches, etc. Also included in this interaction is an important component of athletic outreach: summer sports camps in a variety of areas provide a way for children to visit a university campus and be exposed to what universities have to offer outside of sports.

Athletic facilities are heavily used and are located centrally on the main campus at most major research universities, and ease of access to these facilities is an essential consideration. Most fully-developed campuses include a central field house/gymnasium that is within easy walking distance from most campus locations. Athletic fields are often located at the periphery of campus, but still within a short walk of the central campus. University athletic facilities need to be easily accessible by foot to students, faculty, and staff for several reasons:

- 1) Physical education courses are offered as part of the general curriculum, and students must be able to easily get to course locations during the school day.
- 2) To maximize participation rates and opportunities to all students for extracurricular socialization experiences, intramural athletic fields should be located in close proximity both to the central campus and to student housing.

- 3) To allow for scholar-athletes to compete in intercollegiate sports while carrying a full load of courses, athletic facilities should be located centrally and in close proximity to student housing.
- 4) To facilitate student registration, academic convocations, and graduations as part of the educational program, these facilities should be located centrally.
- 5) To provide an easily-accessible location for non-academic social events that enhance the student experience, these facilities should be centrally located.
- 6) Athletic facilities are heavily used by the student, faculty, and staff population on a daily basis. Providing a central location for physical education enhances accessibility to all while cutting down on the need for automobile traffic, and reducing automobile emissions.

Space Projections

Because there are no published land use standards for collegiate sports facilities, the analysis is based upon industry standards derived from prescribed NCAA dimensional requirements for playfields and sport courts. Data from comparable institutions was utilized to produce required land area ranges in the analysis.

A land area reserve of 148 acres will be provided for Athletics and Recreation at UC Merced. This will be sufficient to support comprehensive programmatic scope at the Division I NCAA. The land areas calculated will allow for initial scope of programming (at any level) as well as probable growth over time as the campus matures.

Parking

The assessment of parking requirements for the UC Merced campus, and of the amount of land area that would consequently be occupied by parking is based on consideration of the amount of parking estimated to be required, as well as the percentage that should be provided in structures

The land requirement for parking is based on standard industry factors and relationships, and on consideration of experience at other UC campuses. Review of parking provisions at other UC campuses places particular emphasis on UC Davis and UC Riverside. UC Davis was chosen as a comparable because of its Central Valley, small town location and its emphasis on Transportation Demand Management (TDM) to reduce automobile dependence. Because of its effective

TDM and bicycling programs, the Davis example represents the low end of the likely range of parking needs for UC Merced. Riverside represents a newer suburban campus with lower TDM effectiveness. It represents the mid-range of the likely needs at UC Merced.

The following table presents the current parking supply per student at UC Davis, UC Riverside and, for comparison purposes, UC Irvine and UC San Diego.

University of California Campus	Student Enrollment	Faculty, Staff	Parking Spaces	Parking Spaces per Student
UC Davis	24,000	8,000	13,600	0.57
UC Riverside	10,600	3,400	6,600	0.62
UC Irvine	17,000	9,000	11,800	0.69
UC San Diego	19,000	12,000	14,200	0.75

Both Davis and Riverside are presently experiencing tight parking supply and are implementing parking expansion programs. The campus-wide average parking occupancy at Davis is about 92%. Anecdotal evidence from Riverside indicates that parking occupancy during peak periods is well in excess of 90%. In such large parking reservoirs, industry standards suggest target occupancy levels of about 85% to allow for reasonable parking-space turnover while minimizing vehicle cruising and idling. Therefore, supply and demand data from the most comparable UC campuses suggest that UC Merced should supply parking at a rate of between 0.62 per enrolled student, or at full enrollment of 25,000, an overall supply of 15,500 parking spaces.

As the UC Merced campus builds out and matures, TDM programs may become more effective. If TDM can be shown to effectively reduce parking demand to levels equivalent to UC Davis, the parking supply that is eventually built may be reduced.

As indicated below, UC campuses have between 0% and 75% of their parking in structures. The typical range for smaller-community campuses is 11% to 14%.

The most obvious reasons to build parking structures are based on land value and surface constraints imposed by campus planning and surrounding uses. Providing high percentages of structured parking also requires higher parking fees from students, faculty and staff. Review of parking provision and utilization levels at

other UC campuses in locations similar to Merced reveals that construction of higher percentages of structured parking does not usually occur until the campus approaches its full planned student enrollment level.

UC receives no public funds to build or subsidize parking. Construction and operating costs for parking must be covered by user charges. Keeping parking fees reasonable at UC Merced, and consistent with other campuses, will be important and will be a factor in determining the timing and number of parking structures that are ultimately built.

On Campus Research

On campus research areas are required for research which needs close *proximity* to the central campus but does not absolutely require the *contiguity* offered by a location in the Academic Core or for reasons connected with the facility or the research contained within it are unsuitable for the Academic Core. Such research may be under the aegis of UC, be funded independently, or even managed by a private for-profit entity.

For certain types of research the industrial nature of the buildings may make them unsuitable for placement in the central campus core. Examples of this are such buildings as large wind tunnels. Other types of research may create noise, visual impacts, and real or perceived hazards which argue for placement outside the intensely developed campus center. Examples include buildings to house shaking tables for seismic simulations for structural research or the Plasma Research Facility at UCLA, which requires its own transformer station (and attendant electro-magnetic radiation fields) to support peak power demands. Still other research facilities may need isolation for protection of experiments, such as facilities for sensitive animal species, for example the Primate Facility at UC Davis. Some UC campuses host research entities which may be wholly or partially independent of the University and its central research functions but whose location on campus enriches the research environment by offering opportunities for extra-mural research collaborations and graduate student employment. The Math Sciences Research Institute at UC Berkeley brings research fellows from around the world to work on mathematics research. MSRI is managed by its own board of directors and occupies a site leased from the University a short drive away from the campus core. Researchers have access to central campus facilities such as the library but are in a serene setting on the campus periphery. At UC San Diego the San Diego Supercomputer Center, which is one of six facilities nationwide funded by the NSF, also occupies a site away from the center of campus. The SDSC

serves major research institutions throughout the western United States, including other UC campuses.

The reasons for creating a research reserve next to the campus include the following:

- the proximity to research sites has been denoted important by faculty, and may well play a key role in attracting top quality faculty to the new university;
- the potential value of the academic research reserve in regular, day-to-day instruction will increase with proximity;
- the proximity affords the potential of greater levels of informal, spontaneous connections which have been shown to be critical in making research partnerships successful; and
- the proximity provides an opportunity to accommodate program needs that may not be physically compatible with the academic core of the institution as discussed above.